

III.—On the Occurrence of a Species of *Regalecus* among the Rocks at St. Andrews; with a few Notes on its Anatomy.
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IN the month of April last, my attention was called by Mr. J. Howie to a fish cast ashore among the west rocks at St. Andrews. This fish proved, after examination, to be a species of *Regalecus*, very likely *Banksii*; but, as it was rather too imperfect for exact specific identification, I propose giving the following description, which may assist zoologists in arriving at that determination:—

The fish was perfectly fresh, but much mutilated. The head was entirely destroyed, and a considerable portion of the posterior end of the body was wanting: as it was, it measured from what appeared to be the coracoid (*i. e.* immediately behind the gills) to the broken end 7 feet 2 inches; 9 inches deep at the coracoid; 12 inches a little before the anus; and $8\frac{1}{4}$ at the broken end. The body was very much compressed, and was of a sword-blade-like shape, the greatest thickness being somewhat below the middle of the depth, where it was $2\frac{1}{2}$ inches thick. From this it gradually tapered away to the dorsal and ventral margins, the dorsal edge being considerably the thinnest of the two, scarcely amounting to $\frac{1}{4}$ inch. There was a dorsal fin extending the whole length, and consisting of 167 rays, which were much broken, as was also their connecting membrane. The longest of these rays measured $2\frac{3}{4}$ inches in length. There was no anal fin. On the right side the pectoral and ventral fins were lost. On the left side the pectoral consisted of eleven broken rays, the longest about 1 inch in length; and the ventral, of a spine about $\frac{3}{8}$ inch in length, and $\frac{1}{4}$ inch in thickness. The skin was completely covered by what appeared to be bony tubercles, the largest of which were arranged in four pretty distinct longitudinal belts, which, from their size, gave to the surface of the body a somewhat ridged-like appearance. These belts or ridges varied from $1\frac{1}{8}$ to $\frac{3}{4}$ inch in breadth, and the spaces between them were occupied by smaller tubercles. None of these tubercles were regularly arranged, but seemed to be placed without any regard to individual connexion or relation to each other. Between some parts of the tubercles there was a beautiful silvery-looking lustre, which was very easily taken off, adhering to the fingers or to any object that came in contact with it. There were a few faint dark streaks on the anterior part of the body, proceeding from the dorsal margin and extending obliquely downwards and backwards, but not appearing to cross the lateral line. The lateral line at the coracoid was about one-third from the dorsal edge; thence it descended obliquely

till about halfway between it and the anus. It then proceeded pretty straight, but still converging towards the ventral edge as it extended outwards to the posterior end; at the anus it was $2\frac{1}{2}$ inches from the margin. The anus was 4 feet 6 inches from the coracoid. The viscera were not particularly examined; this is the less to be regretted, as the viscera of *Regalecus* have been already clearly described by Messrs. Hancock and Embleton*. But, on cutting open the fish, the cæcal prolongation of the stomach was observed to pass behind the anus for the whole length of the portion preserved, and had evidently extended a considerable way beyond.

This specimen of *Regalecus*, like the others that have been found on the British shores, was very tender, and could have been easily broken to pieces; so much so that, on attempting to draw it out of the pool of water in which it lay, with a common crab-hook, which is quite thick and blunt at the point, the hook went right through it. In fact, the use of the hook had to be dispensed with, in order to preserve entire as much as possible of the fish.

The internal structure was not further examined at this time. The following description was drawn up from a piece of the fish commencing about 6 inches behind the vent, and extending to 20 inches in front of it, and after it had lain eight months in spirits.

The vertebral column was enclosed by a strong fibrous sheath or membrane, two branches of which proceeded from the upper side of the column to form the neural canal; they were at first about $\frac{4}{12}$ inch apart, approximating as they ascended, till they finally coalesced about $\frac{1}{4}$ inch above the vertebral column. From this point a single membrane passed vertically up the middle of the body, and enveloped the lower ends of the interneural spines. From this central membrane there were three septa or bands sent outwards on each side, till they became confluent with the corium or inner skin. From the middle of each side of the vertebral column there was another of these aponeurotic septa sent outwards till they joined the skin, and formed a strong connecting-band between it and the vertebral column.

The hæmal canal was formed by two membranes proceeding from the lower side of the vertebral column, and passing downwards about $\frac{3}{8}$ inch, when they coalesced. There was a slight swelling of the membrane at the coalescence, from which a band or septum was sent out on each side to join the skin, and another passed vertically downwards for a short distance, when it enlarged considerably immediately above the abdominal cavity. From this enlargement two bands were sent outwards, one on

* Ann. Nat. Hist. ser. 2. vol. iv. p. 7 et seq.

each side, to join the skin; other two proceeded downwards, and formed the lining of the abdominal cavity, at the lower edge of which they again coalesced, enlarged, and extended down to the ventral margin. The septa or bands connecting the lining membrane of the abdominal cavity and the corium were very numerous, from a little below its commencement down to the ventral edge of the fish.

The vertebral column appeared to be only a stage in advance of the primitive notochord, and presented no appearance externally of being segmented, but looked like a continuous flexible column, without any prominence or depression to indicate where the segments were. The only inequality visible was a slight depression on the sides between the neural and hæmal arches. The column had a somewhat hexagonal appearance externally, which was partly caused by its enveloping-membrane thickening along the middle of each side, where it proceeded outwards. When the column was bent from side to side, the joints were apparent; and when cut open, there was a slight depression observed at the joints, which was caused by the cartilage of each segment or vertebra not quite meeting that of the next.

The centra of the vertebræ were composed of what to the unaided eye appeared to be simple cartilage, and were entirely devoid of ossification; they measured on an average about $1\frac{3}{4}$ inch in length, and had the appearance of gradually shortening, the centra of the posterior end being slightly shorter than those of the anterior. Each centrum was hollowed out internally at both ends into a conical or hourglass-shaped cavity. The apices of the cavities were separated from each other in the middle of the centra by a layer of cartilage about $\frac{1}{2}$ inch in thickness, through which there was a small perforation, virtually connecting them together. The vertebral centra were $\frac{1}{2}$ inch in diameter, their contiguous cup-margins being very thin, scarcely amounting to $\frac{1}{12}$ inch. The cavities of the centra of the vertebral column were round internally, and were filled with a gelatinous-looking substance of sufficient consistency to retain its conical shape at both ends after being removed. This substance had been the base of the primitive embryonic chorda dorsalis, around which the cartilage had afterwards been developed. In its latter condition it consisted of alternate swellings and contractions corresponding to the internal shape of the column; in this form it had extended, in all probability, the whole length of the body. The neurapophyses consisted of narrow pieces of cartilaginous-looking laminæ developed in the walls of the membrane which formed the neural canal. At their lower ends they were firmly anchylosed to the middle of the centrum of each of the vertebræ; at their upper ends they coalesced at the same

point as the membrane, and in this way they formed a series of rudimentary neural arches. The neural spines were about $3\frac{1}{2}$ inches long, and consisted, as well as the arches, of what appeared to be the hardest cartilage in the fish; they were confluent and perhaps connate with the neurapophyses, from which they extended up to a little beyond the commencement of the interneural spines. These neural spines were slender, flexible, and not easily recognized in the central membranous partition already referred to, in the walls of which they were developed, and remained imbedded. The interneural spines commenced about $4\frac{1}{2}$ inches below the dorsal margin. They were at first small, thread-like, and quite hid in the enveloping membrane, but gradually enlarged as they approached the dorsal margin, where they were about $\frac{1}{8}$ inch across. These spines began to expand on both sides, before and behind, about half an inch from their upper extremities. This expansion went on increasing till each spine was half an inch in breadth, when the enlarged or projecting portion joined that of the spine next to it, before and behind, and thus formed a continuous cartilaginous and strengthening ridge extending along the dorsal margin. The lateral projections of the interneural spines did not extend quite to the upper edge, but sloped away a little from the middle of the upper ends of the spines downwards on both sides, which formed a series of notches extending along the upper edge; each notch corresponded to, and was placed immediately above, the junction of each pair of spines. In these notches or cavities oval-shaped pieces of cartilage were placed, and held by ligaments, which allowed them a free motion principally from side to side; to these cartilages the bifurcated fin-rays were attached. There was a small disk-like addition on each side of the lower ends of these double rays, which was in contact with, and firmly held by ligaments to, the lateral surfaces of the oviform cartilages. The dorsal fin-rays were bifurcated for a considerable part of their length; it is very likely that they were confluent at the points, but of this I am not certain, as none of them were entire. For upwards of two inches of their length, however, they appeared to have had only a membranous connexion.

The parapophyses existed as cartilaginous laminæ developed in the membranous walls of the hæmal canal, anchylosed at their upper ends to the middle of the lower sides of the vertebral centra, and coalescing at the lower ends about three-eighths of an inch below the vertebral column; in this way they formed a series of contracted hæmal arches, which contained the aorta and the vena cava. There were thread-like hæmal spines confluent with and proceeding downwards from the parapophyses, till they were finally lost in the walls of the membrane a little above

the abdominal cavity. From what was observed, it appears that these spines grew longer as the cæcal cavity grew less, towards the distal end of the fish.

The *Regalecus* appears to be rather a rare fish everywhere, its first recorded occurrence in Britain being in the 'Annual Register' of 1759. Since that time some eleven or twelve specimens have been observed, all on the north-east coast. Its first recorded occurrence in Scotland was of a specimen stranded at the village of Crovie, in Banffshire, in 1844. Another was stranded in the Bay of Cromarty in 1852. The St. Andrews fish, in 1861, makes the third time it has been noticed on the Scottish coast.

IV.—*Descriptions of new Species of Phytophagous Beetles.*

By JOSEPH S. BALY.

Genus LEMA, Fab.

Lema frontalis.

L. anguste oblonga, subcylindrica, nitida, testacea, pectore antice abdomineque piceis; capite (fronte excepto) nigro; antennis subfiliformibus, articulo ultimo basi fulvo-albo; thorace transverso, subcylindrico, lateribus medio modice constrictis, dorso ante basin transversim sulcato, hic illic fortiter punctato, medio utrinque unifoveolato; elytris viridi-cyaneis, basi vix elevatis, infra basin transversim depressis, sat profunde striato-punctatis, interspatiis lævibus, remote punctatis, ad apicem subelevatis; tibiis extrorsum tarsisque fuscis.

Long. 2–2½ lin.

Hab. Lizard Islands, Northern Australia.

Narrowly oblong, subcylindrical, nitidous, testaceous; anterior part of breast and the abdomen piceous; elytra cyaneous; apical half of tibia, together with the tarsi, nigro-piceous. Head black, with the exception of a large oblong rufous patch on the forehead; face triangular, its lower portion slightly produced; epistome separated from the face by a deep groove, from the apex of which an oblique sulcation runs upwards on either side along the edge of the orbits; upper portion of face coarsely punctured, bilobed; antennæ moderately robust, subfiliform, basal half of apical joint obscure white. Thorax transverse, sides moderately constricted in the middle, the upper surface deeply impressed in front of the base with a transverse sulcation, which extends at either end into the lateral constriction, its middle impressed with a single deep fovea; surface of disk coarsely punctured on the sides in front and down the middle, the latter part impressed on either side by a large deep fovea. Scutellum